THE DIETS OF TEN LOW-INCOME NEGRO FAMILIES

by

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INTRODUCTION

Relief agencies are asking for information concerning the food habits of the Negro people to determine the dietary essentials for this group. The present investigation was made to furnish some basis for the food recommendations made by case workers for these clients. It was also desired to detect the need of the under-privileged Negro homemaker for education in food values and money expenditure for food. It was further believed that the results of this study would be of interest when compared with those made on other groups.

REVIEW OF LITERATURE

Hawley (6), in 1927, suggested that in analyzing a diet it is necessary to know the food needs of the family and whether the food supplied meets these needs. She compared five energy scales and standards for evaluating diets in general use in the United States at the time of her study. As a result, she proposed a new scale believing it to be a more accurate way of evaluating the nutritive needs of a family. The new scale included a double standard for children, one for energy and another for protein and

minerals. This recognized the high requirement of children for these last essentials. Hawley's scale also allowed for increase or decrease in activity of an adult and for lowered energy metabolism in old age.

In 1932, Hawley (7), working with a committee representing public and voluntary health agencies as well as the county medical society, studied with the help of nutritionists from the University of Rochester, the low-cost dietaries of relief clients in Rochester, New York. These workers found that poor selection contributed largely to the inadequacy of the diets and recommended adoption of the following points as aids to solving the problems of low cost dietaries:

1. Adopting an adequate diet standard.
2. Using a master list of foods suitable for relief and welfare clients.
3. Securing the cooperation of the grocers filling welfare orders.
4. Issuing special diet orders suited to specific diseases.
5. Delivering milk to clients rather than depending upon them to purchase it.
6. Establishing an educational program in cooperation with relief agencies to give simple health instruction.

7. Establishing a visiting service of trained women to go into the homes to give practical advice and help, either as volunteers or paid workers.

Hawley believed if the above rules were followed they would eliminate much of the inadequacy in the diets of low-income families.

In 1932, Okey and Smythe (8) analyzed the food purchases of 25 California families dependent on the Berkeley Welfare Society. The purpose of the study was to learn how low-income families select their foods when given relatively free choice from a market order list. This information was needed by the agencies supplying relief families to give them some idea of the adequacy of diets consumed by relief clients. The findings indicated the use of fats and sweets in excess and a lack of vitamins. These workers suggested the possibility of almost a total loss of vitamins from originally good food sources, as a result of prolonged and unnecessary cooking due to ignorance and carelessness on the part of the housewife.

Although these 25 indigent families received the largest monetary allowance permitted, some of them through unwise expenditure obtained less than the recommended energy standard of 3000 Calories daily per adult male unit. However, the average for the group tended to be reasonably

adequate in respect to energy.

All except one family purchased a sufficient quantity of protein foods to meet the minimum standard for this nutrient. The amount was still lower, however, than the protein consumption in a typical American dietary.

The mineral intake more nearly approached the minimum than should be expected in a low-cost dietary. Deficiency in calcium paralleled a low milk consumption. Legumes raised the iron content of these diets to an appreciable degree.

The families were receiving from $0.26 to $0.43 per adult male unit per day for food. The average daily cost of the food per capita was $0.33. These workers believed this was sufficient money to purchase adequate food had it been wisely expended.

Two years later, Okey working with Luck (9), reported another study of two week's duration of the foods purchased by 233 dependent families of Alameda County, California. It was desired to determine the nutritive value of the diets selected by such a group from a grocery order allowing approximately 10 per cent less than the cost at current prices of an adequate diet. However, these groceries were supplemented by an undetermined amount of Red Cross flour. With this addition, the workers believe that with increased

home baking the money would purchase an adequate diet.

The average energy value per adult male unit per day was found to be 2551 Calories. The diets also supplied an average of 0.63 gram of calcium, 1.00 gram of phosphorus, and 10.8 milligrams of iron. The supply of vitamin A was ample, but that of B and C was low. No provision was made for vitamin D.

These workers concluded that untrained people can not be expected to choose a diet adequate to meet the body's need for nutrients when given an unrestricted grocery order slightly under the amount required to purchase an adequate diet.

Wiehl (15) in 1932, as part of a study conducted by the United States Public Health Service, analyzed the diets of 100 low-income families in different sections of the eastern and southern parts of the United States. The group investigated included five industrial cities, New York City, Birmingham, a mining district of West Virginia, and a cotton mill village in South Carolina.

For families living in the five industrial cities on a weekly income of less than $2.00 per person, the average daily energy intake was nearly 20 per cent below the 3000-Calorie standard. Families living in New York City, whose income was less than $4.00 per person weekly, had diets

similarly low in Calories. Relief families, except those in New York City, had a higher caloric intake than the non-relief group. It appeared that 25 per cent of the non-relief families in five cities and 29 per cent in New York City had less than 2200 Calories per adult male unit daily. The energy value of the diets in the other three communities equalled or exceeded the standard. This was because of the generous use of large quantities of fat meat and flour or other cereal foods.

Milk, vegetables, and fruits were deficient in the diets in all the communities studied. In the five industrial cities the milk consumption was one third less than the minimum requirement. The average intake of fruits and vegetables was about equal to the minimum needs of the subjects. Bread and cereals were used too sparingly for low-cost diets. Meats, fish, eggs, and sugar exceeded the quantities suggested for an adequate low-cost diet. Because of the high intake of these foods, the diets were low in minerals and vitamins.

Cowles (2), in 1933, investigated the money value of the winter food consumption of 109 Wisconsin farm families and calculated the food value of 59 of these diets. She found the total cost of food per adult male unit averaged $2.29 for the week covered by the study. She also noted

that with large families the per capita expenditure was lower.

Two households were lacking in all five nutrients studied; i.e. Calories, protein, calcium, phosphorus, and iron. However, in neither was the deficiency as much as 10 per cent. Six families were low in four of the above five nutrients and in two families the deficiency amounted to 10 per cent or more. A larger proportion of the diets were low in iron than in any other nutrient.

Of the total number studied, 31.6 per cent of the families had some dietary deficiency. Calories were low in 26.3 per cent of the cases. Calcium showed some deficiency in 15.6 per cent of the families, and serious lack in 10.5 per cent. The need for protein was met more frequently than that for any other nutrient. This was no doubt due to the readily available sources of protein on the farm in the form of milk, meat, and eggs.

There appeared to be no shortage of protein, calcium, or phosphorus and little in Calories when as much as $2.40 per adult male unit was spent per week for food. This was due to the large amounts consumed, however, rather than to wise choice of food.

In 1935 Cowles (3) conducted another study of two weeks duration of the food consumption of 103 families in

the Land Purchase Area of Forest County, Wisconsin. Thirty-six of the number were on work relief, thirty-one on commodity relief, and thirty-six were non-relief families.

Unsatisfactory diets appeared to be often the result of poor management. About 7 per cent of the entire group had diets completely inadequate. Over three-fifths were deficient in at least one nutrient. Work relief diets were best, being 81.3 per cent adequate for energy, protein, calcium, phosphorus, and iron.

The consumption of vegetables by all groups was low. Meat and fish nearly reached the standards suggested for dietaries at a minimum cost level. Serious calcium deficiency appeared most frequently in the diets of families on work relief, but only one of the group was low in phosphorus.

In some cases, cereals could have been increased to advantage. The protein intake was most seriously below standard in the families on commodity relief. This deficiency in protein occurred where the intake of lean meat and fish was small, and, in a smaller number of cases, where the use of milk was limited. A considerable quantity of protein was consumed in the form of navy beans.

There was little indication that size of household

had any relationship to the degree of adequacy of the diets in either of the relief groups. This was perhaps due to the quantity of food or money issued, as the amount allowed was proportionate to the size of the household.

Cowles suggested, "The adequacy of the dietaries appeared to be very clearly related to the total value or cost of food consumed." She also concluded that:

1. "Even a well planned and administered relief dietary may go wide of its mark of achieving nutritional adequacy if the family is lacking in the knowledge or skill necessary to administer it in the home. Education in food values and preparation and in methods of money management and simple housekeeping should be of great value to families having to get along on a limited budget. This education might well be made available to relief families and to those families who are anxious to keep off relief.
2. "Not only is emphasis needed on planning ahead for the spending of the food money in the market, but on budgeting and planning for raising and preserving food at home."
3. Especial attention to securing dietary adequacy apparently should be given to large families.

4. With the average housewife's present state of knowledge concerning food and an adequate diet, it appears to be desirable to allow more money for food when free choice is permitted than is necessary when buying on food orders.
5. It seems that many of the families studied would have been less adequately fed had they been given the equivalent in money to spend for food without supervision.

Gray (5), in a study of the intake of one family's food during the depression in 1935, showed that savings can be effected by careful marketing. Her findings suggested that those living on a very low income are likely to have a deficient diet, agreeing with other workers in this respect. Careful records were made of all food purchases, including the amounts and cost.

According to accepted food standards for women, the diet was low in protein and minerals. It furnished per person per day 2,372 Calories, 41 grams of protein, 0.59 gram of calcium, 0.79 gram of phosphorus, and .00759 gram of iron.

Spoelstra (13) made an analysis of the diets of 10 low-income families of Manhattan, Kansas in 1936. Her investigation showed that at least 70 per cent of the diets

of the families studied were inadequate in almost all nutrients.

Every diet was deficient in vitamins. The greatest shortage in minerals was for iron and more families were low in phosphorus than in calcium. There seemed to be an apparent correlation between deficiency in protein and minerals, as the six diets lacking in protein were also low in minerals, with one exception.

All families failed to use a sufficient quantity of milk, the average per child without allowing for adults being only 1.11 pints per day. Two other common dietary errors were the use of too little fruit, especially of the citrus variety, and of fresh vegetables other than potatoes.

The adequacy of the diets appeared to have a direct relationship to their money value. The relationship between expenditure and adequacy was not close on account of differences in size of the families and the amount of food obtained other than by purchase. It was evident that the income was too limited to provide really adequate food, especially if the family were large.

The following points were suggested for improving the diets:

1. Increased use of whole grain cereals with a decrease in the prepared variety.

2. Increased use of home made bread with corresponding decrease in the amount of bakers' bread used.
3. Increased use of dried legumes.
4. Increased milk consumption.
5. Increased use of fresh fruits and vegetables.
6. Increased use of inexpensive cuts of meat.
7. Decreased use of sugar.

In a recent popular article (4) the Bureau of Home Economics has interpreted a dietary study carried on by the Bureau of Labor Statistics in 1935. This study included White families in the North Atlantic states, Pacific states, and East South Central region, as well as Negro families in the South. The investigation of each family covered a one-week period in each of the four seasons of the year. The records were obtained by the inventory method and the investigator checked the records each day with the housewife.

The findings showed a wide variation in the money spent for food in different sections of the country. Comparatively few of the northern, eastern, and Pacific families were living on less than 9 1/2 cents a meal while 41.0 per cent of the White families of the South, and 70 per cent of the Negro families were living on less than this amount.

When the diets of White families spending $1.60 per person per week for food were compared with Negro families spending a like amount, certain differences in food selection were noted. The Negro groups apparently used less milk, eggs, citrus fruits, other fruits, and vegetables other than leafy ones. They used more meat, poultry, fish, sugar, sirup, jelly, flour, fat, and leafy vegetables.

The Bureau concluded: "If higher levels of nutrition are to be attained by low-income families, some families need more money for food..... Some families need to apply more effectively our present knowledge of food and nutrition to their food selection problems, and so get better diets with the money now available."

PROCEDURE

A study was made of the food intake of 10 low-income families, each for a period of 28 consecutive days. The cooperation of the families, all of whom lived in Manhattan, Kansas, was secured through the local relief agency.

A case worker accompanied the investigator on the first visit to the home of a family, in order to insure understanding and willingness to participate. The purpose of the study was explained at this time, also how the data were to be recorded. An appointment was made with the

housewife for the next visit at which time a weighed inventory was taken of all food supplies on hand. The amounts were recorded as indicated in form 1.

The housewife was asked to record certain data each day (form 2). These records included the amount and cost of all food purchased as well as that obtained from other sources. She also listed the menus she served for each meal, the number of meals eaten away from home by members of the family, any meals served to guests, and food fed to pets or otherwise consumed.

The menus gave some idea of the accuracy of the diets, as well as the desirability of the methods used in preparing the food. They were also particularly helpful in determining whether the diets were limited to the foods listed as purchased or otherwise obtained. It thus became possible to detect and correct discrepancies in the records. These record sheets were collected four or more times a week. The frequent contacts with a family gave opportunity to check the records with the housewife and to make any corrections that appeared to be necessary.

Personal data concerning each family were recorded on form 3. It was hoped that the information thus obtained would be helpful in the interpretation of the results.

At the end of the period of investigation another

Form 1

INVENTORY BLANK

Name_____ Date_____

Food	Amount lb.-oz.	Cost per unit	Total cost
Dairy products			
Butter			
Cheese			
Cheddar			
Cottage			
Milk, condensed			
Milk, dried, skimmed			
Milk, dried, whole			
Milk, evaporated			
Milk, fresh, whole			
Milk, fresh, skimmed			
Eggs			
Fats and oils			
Fats			
Compound			
Lard			
Oleomargarine			
Oils			

INVENTORY BLANK

Food	Amount lb.-oz.	Cost per unit	Total cost
Fruits			
Canned			
Dried			
Fresh			
Grain products			
Bread			
Brown			
White			
Other			
Cakes			
Flour			
White			
Other			
Meals			
Meat			
Bacon			
Beef			
Pork			
Miscellaneous			
Coffee			

INVENTORY BLANK

Food	Amount lb.-oz.	Cost per unit	Total cost
Miscellaneous (con't.)			
Chocolate			
Cocoa			
Cod liver oil			
Flavorings			
Salad dressing			
Salt			
Spices			
Tea			
Vinegar			
Yeast			
Nuts			
Sugar			
Brown			
White			
Sirups			
Vegetables			
Canned			
Dried			
Fresh			

Form 2

DAILY HOME RECORD

Name_____ Date_____

Food eaten at meal time at home

Breakfast	How prepared	Dinner	How prepared	Supper	How prepared

Food eaten away from home

Name of food	How prepared	Person eating

Food eaten between meals

Name of food	How prepared	Person eating

Lunch - school or other

Number	Foods used	How prepared

Food fed to pets

Pets	What fed

Meals served to guests

Number	Breakfast	Number	Dinner	Number	Supper

Foods for today

Purchased			From other sources			Given away		
Food	Amount	Cost	Food	Amount	Cost	Food	Amount	Cost

Form 3

HOME SURVEY BLANK

Town_____ Date_____ Name_____

Composition of family

Adults	Age	Children	Age
1.		1.	
2.		2.	
		3.	
		4.	

I Economic status

1. Total amount of income_____

2. Number in family contributing to income_____; amount each contributes_____

3. Home owned_____; rented_____; rent free_____

4. Number of families occupying house_____

5. Number of rooms_____

II Home life

1. Meals at which family eats together: breakfast _____; dinner_____; supper_____

III House - interior

1. Toilet: indoor_____; outdoor_____; pit_____

2. Bath tub: yes_____; no_____

3. Water supply: open well_____; pump_____ indoor_____

4. Stove: yes_____; no_____; gas_____; coal_____; wood_____; oil_____

IV Source of food: garden_____; chain store_____ general store_____; relief_____; gifts____

V How purchased: cash_____;credit_____

inventory was taken. The amount of food on hand at this time was subtracted from the sum of that obtained during the period and that on hand at the beginning of the study. This gave the amount consumed during the period by the family after corrections were made for meals served to guests and for food otherwise used.

The diets for each family were calculated for Calories, protein, calcium, phosphorus, and iron, and when data permitted, for vitamins A, C, and G. Biological units, developed in Sherman's laboratory were used in all cases for indicating the vitamin content of the diets. Vitamin A is expressed in terms of the Sherman-Munsell unit; C, as the Sherman-LaMer unit, and G, as the Sherman-Bourquin unit. The families were converted into adult male units according to Hawley's double scale (6) which was modified to include vitamins (table 1). The diets were then compared with standards set by Sherman (11) for Calories, protein, calcium, phosphorus, and iron and by Stiebeling and Ward (14), for vitamins.

RESULTS AND DISCUSSION

Personnel of the Families

The personnel of the families is shown in table 2. The ten households studied totaled 22 adults and 39 children

Table 1. COMPUTATION OF MEALS PER ADULT MALE UNIT PER DAY

Family	Adults	Children	Adult Male Units		Extra Meals			Meals per Adult Male Unit					
								Energy			Protein, Minerals, and Vitamins		
			Energy	Protein-minerals	Guest meals	Meals out	Difference	Normal number per period (3x28xA.M.U.)[1]	Adjustment for extra meals	Number per day	Normal number for period (3x28xA.M.U.)[1]	Adjustment for extra meals	Number per day
I	3	1	2.9	3.3	4	1	3[2]	243.6	246.6	82.2	277.2	280.2	93.4
II	4	9	10.9	13.0	0	0	0	840.0	840.0	280.0	1092.0	1092.0	364.0
III	2	6	5.2	7.7	0	1	1[3]	436.8	435.8	145.3	646.8	645.8	215.3
IV	2	3	3.2	4.4	0	23	23[3]	268.8	245.8	81.9	369.6	346.6	115.5
V	2	2	2.6	3.4	0	0	0	218.4	218.4	72.8	285.6	285.6	95.2
VI	2	5	4.9	6.7	0	0	0	411.6	411.6	137.2	562.8	562.8	187.6
VII	2	3	3.0	4.2	0	16	16[3]	252.0	236.0	78.7	352.8	336.8	112.3
VIII	1	1	1.4	1.8	16	0	16[2]	117.6	133.6	44.5	151.2	167.2	55.7
IX	2	6	5.3	7.7	28	0	28[2]	445.2	473.2	157.7	646.8	674.8	224.9
X	2	3	3.6	4.8	0	9	9[3]	302.4	293.4	97.8	403.2	394.2	131.4
Total	22	39	43.0	57.0	48.0	50.0		3536.4	3534.4	1178.1	4788.0	4786.0	1595.3
Average	2.2	3.9	4.3	5.7	4.8	5.0		353.6	353.4	117.8	478.8	478.6	159.5

1. 3 (meals per day) x 28 (days of the study) x A.M.U. (adult male units)
2. These figures were added to the number of meals per adult male unit.
3. These figures were subtracted from the number of meals per adult male unit.

Table 2. PERSONNEL OF FAMILIES

Family	Adults	Children														Total
	Per family	Under 6 years		6-9 years		10-12 years		13-14 years		15-17 years		Total				Adults and children
		Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Both sexes		
I	3	1										1		1		4
II	4	1	1	1	1	1		1	1	1	1	5	4	9		13
III	2	1	2		1	1		1				3	3	6		8
IV	2	1	1	1								2	1	3		5
V	2	1			1							1	1	2		4
VI	2	2			1			1			1	3	2	5		7
VII	2		3									0	3	3		5
VIII	1					1						1	0	1		2
IX	2	1	2	2						1		4	2	6		8
X	2		1		2							0	3	3		5
Total	22	8	10	4	6	3		3	1	2	2	20	19	39		61
Average per family	2.2											2.0	1.9	3.9		6.1

making an average of 2.2 adults and 3.9 children or 6.1 persons per family. The size of the families varied greatly. One family (VIII) was composed of only two members, an elderly woman of 70 years and a boy 11 years old. Another family (II) consisted of 13 individuals, 4 adults and 9 children, the latter ranging in age from 3 to 17 years.

One family (IX) lived on an entirely paved street; the remainder on alleys or in unpaved districts. Half of the families lived in the same neighborhood which was located close to the railroad. Their homes were small and without modern conveniences.

Family X was the least crowded in living quarters with an average of 2.5 persons per room. This group also lived under more sanitary conditions than the others. Family II had the least space per person of any of the 10 studied, with 13 members occupying three rooms during the day. However, a room was rented from a relative next door for sleeping purposes; thus, the average for part of the time was reduced to 3 1/3 persons to the room. Other facilities were as inadequate as the sleeping quarters in this case. Of all the families studied, none had indoor provision for water, bath, or toilet. They used unsanitary outdoor toilets and carried water from near-by hydrants.

The mother in Family I took particularly good care of her eight-month old baby which was evident in the state of his physical health. He was the only child in any family receiving cod liver oil during the period studied. The children in the other families, however, seemed normally healthy except for a few underweight cases. These were especially evident in Family VII in which two girls, two and three years old respectively, were thin and emaciated. This family exhibited poor habits of personal health in almost all respects.

The incomes of the families ranged from an estimated $25.00 to $60.00 a month. Family IX, consisting of eight members, had the highest income. Frequently the women in the different families went out to do housework or did laundry work at home. No exact record of money earned in this way was available. Family V, composed of a mother, two children, and a grandmother, had their chief source of income from a relative living in a Civilian Conservation Corps camp. The grandmother did housework outside the home in an effort to make the income go further and was the recipient of frequent gifts of food from her employer.

Four families obtained the greater portion of their income from work relief. In five other cases the head of the family was regularly employed. About half received

some commodity relief to supplement their limited funds.

Nutritive Value of the Diets

A summary of the findings for each of the 10 families is shown in table 3. The averages per adult male unit are compared with standards set by Sherman (11) and by Stiebeling and Ward (14). No diet was completely adequate for the nutrients studied; although one (V) was deficient only in vitamin A. Five of the diets were entirely inadequate, lacking in every nutrient evaluated, (II, III, VI, IX, X). Three diets were adequate for Calories (IV, V, VIII), five for protein (I, IV, V, VII, VIII), two for both phosphorus and iron (V, VIII), and one each for calcium (V), and vitamins C (V), and G (V).

The average daily energy intake of the different families ranged from 1730 to 4222 Calories with a mean of 2741 Calories per adult male unit. This was 8.6 per cent below the standard recommended by Sherman (11). Family II, with the lowest caloric intake of the entire group, was 42.3 per cent below the standard in this respect, while Family V, with a mean of 4222 Calories per day, was 40.7 per cent high in energy intake (table 4).

The four best sources of Calories in these diets arranged in the order of their importance were grain products, meat, fruits and vegetables, and sweets (table 5).

Table 3. NUTRITIVE VALUE PER ADULT MALE UNIT OF THE DIETS OF TEN LOW-INCOME FAMILIES**

Family	Calories	Protein	Carbohydrate	Fat	Calcium	Phosphorus	Iron	Vitamins		
								A	C	G
		grams	grams	grams	grams	grams	grams	units	units	units
I	2199	72.8*	267.3	93.2	0.428	1.064	0.011	1877	44	280
II	1730	40.9	270.3	53.9	0.148	0.512	0.006	1397	26	82
III	2837	62.4	438.8	92.5	0.255	0.771	0.011	2234	37	193
IV	3328*	73.7*	499.3	115.1	0.269	1.036	0.008	1447	30	118
V	4222*	116.1*	534.6	179.9	0.735*	1.679*	0.018*	3718	138*	820*
VI	1854	46.9	289.8	56.4	0.265	0.658	0.005	1307	60	138
VII	2794	73.9*	422.3	89.9	0.304	1.057	0.012	745	33	207
VIII	3600*	98.5*	518.3	127.0	0.487	1.501*	0.016*	2397	39	288
IX	1862	33.2	306.0	56.1	0.194	0.510	0.005	553	35	62
X	2985	51.0	373.0	143.2	0.353	0.825	0.009	772	45	245
Average	2741	66.9	391.9	100.7	0.344	0.961	0.010	1645	49	243
Standard	3000	70.0			0.68	1.32	0.015	4000	100	750
Percentage variation from standard	-8.6	-4.4			-49.4	-27.2	-33.3	-58.9	-51.0	-67.6

* Above standard.

** Sherman's standards were used for Calories, protein and minerals; Stiebeling and Ward's for vitamins.

Table 4. PERCENTAGE VARIATION FROM THE STANDARD[1].

Family	Calories	Protein	Calcium	Phosphorus	Iron	Vitamins		
						A	C	G
I	26.70	4.0*	37.1	19.4	26.7	53.1	56.0	62.7
II	42.34	41.6	78.2	61.2	60.6	65.1	74.0	89.1
III	5.43	10.9	62.5	41.6	26.7	44.1	63.0	74.3
IV	10.93*	5.3*	60.4	21.5	46.7	63.8	70.0	84.6
V	40.73*	65.9*	9.3*	27.2*	20.0*	7.0	38.0*	9.3*
VI	38.20	33.0	61.0	50.2	66.7	67.3	40.0	81.6
VII	6.87	5.6*	55.3	19.9	20.0	81.4	67.0	72.4
VIII	20.00*	40.7*	28.4	13.7*	6.7*	40.1	61.0	61.6
IX	37.93	52.6	71.5	61.4	66.7	86.2	65.0	91.7
X	0.50	27.1	48.1	37.5	40.0	80.7	55.0	67.3
Average	8.6	4.4	49.3	27.2	33.3	58.9	51.3	67.6

1. Standards used: 3000 Calories, 70.0 gm. protein, 0.68 gm. Calcium, 1.32 gm. phosphorus, 0.015 gm iron, 4000 units vitamin A, 100 units vitamin C, and 750 units vitamin G.

* Indicates percentage above the standard; when no * used, deficiency is indicated.

Table 5. AVERAGE PERCENTAGE DISTRIBUTION OF NUTRIENTS IN DIETS OF TEN LOW-INCOME FAMILIES

Food Group	Calories	Protein	Carbohydrate	Fat	Calcium	Phosphorus	Iron	Vitamins		
								A	C	G
Dairy products	7.5	6.8	2.7	16.5	42.2	12.5	3.1	25.9	1.9	18.6
Eggs	1.2	3.3		2.3	3.3	3.2	4.8	18.0		12.5
Fats and oils	9.2	0.2		33.4				0.3		
Food adjuncts	0.2									
Fruits	4.0	1.3	6.7	0.5	5.8	3.4	4.0	20.8	47.5	5.4
Grain products	37.4	37.6	50.2	6.1	17.3	29.5	29.8	0.4		0.7
Meats	16.5	32.6	0.1	36.0	5.9	25.8	28.1	17.9		41.9
Miscellaneous	0.6	0.6	0.5	1.0	1.3	1.5	0.8			
Nuts	0.5	0.7	0.1	1.0	0.4	0.8	0.4			
Sugar and other sweets	13.0	0.1	24.7	1.3	0.3	0.3	0.6			
Vegetables	10.1	17.0	14.8	2.1	23.1	23.0	28.0	16.7	50.6	20.8

Grain products supplied an average of 37.4 per cent of the total Calories for the 10 families. This was 5.6 per cent less than the amount recommended for a restricted diet for emergency use, or 5.4 per cent more than is suggested for an adequate diet at minimum cost (table 6). These subjects obtained slightly more of their Calories from grain products than did those in Spoelstra's 10 low-income White families (table 6). The difference, however, amounting to 2.4 per cent, was relatively small.

The proportion of total energy received from meat, fish, and eggs was high amounting to 17.7 per cent. This was more than twice as much as suggested for an adequate diet at minimum cost and more than three times that recommended for a restricted diet (table 6). This group of foods ranked second as a source of energy for these diets. These findings agree with those of the Bureau of Labor Statistics (4) that low-income Negro families use large amounts of meat. It is apparent that these families used much more meat than Spoelstra's group of White families of the same economic level (table 6).

Fruits and vegetables, usually regarded as foods with low caloric value, supplied in this study slightly more Calories than sugar and other sweets amounting to 14.1 per cent for the former and 13.0 per cent for the latter (table 6).

Fats and oils, also foods with high fuel value, furnished slightly less than 10 per cent of the total energy used by

Table 6. COMPARISON OF PERCENTAGE DISTRIBUTION OF CALORIES IN DIETS

Diets	Calories derived from:					
	Bread Cereals Flour	Milk Cheese***	Vegetables, fruits	Fats	Sugars	Meats Fish Eggs
Restricted diet for emergency use*	43.0	15.0	13.0	16.0	9.0	5.0
Adequate diet minimum cost*	32.0	24.0	14.0	15.0	7.0	8.0
Spoelstra's study**	35.0	13.8	14.8	11.4	14.2	8.2**
This study	37.4	7.5	14.1	9.2	13.0	17.7

* From Stiebeling and Ward (14).

** In Spoelstra's study (13) eggs were included in dairy products.

*** Including all dairy products.

these families (table 6). Butter was listed with dairy products rather than with fats and oils but the amount of this food used was so small that it would have made no appreciable difference had it been included with fats and oils.

Protein was present in sufficient amounts in five or 50 per cent of the diets studied (table 3). Apparently this nutrient was the one most frequently supplied in adequate quantities. This may be attributed to the comparatively large amounts of grain products, meat, and dried legumes used by these families. It was in no sense due to the use of milk, and in only one family (V) was cheese a large factor in the diets (table 7). The protein of the remaining five diets, would undoubtedly have been improved by the use of more milk, cheese, and dried legumes.

The average daily protein consumption for the group was 66.9 grams per adult male unit. This was only 4.4 per cent less than the standard of 70 grams (table 3). The protein consumption of the individual families ranged from the very low intake of 33.2 grams by Family IX to as high as 116.1 grams by Family V.

Grain products ranked first as a source of protein in these diets, supplying 37.6 per cent of the total (table 5). Meats were second furnishing 32.6 per cent. Dairy products accounted for only 6.8 per cent of the protein eaten.

Calcium was low in 90 per cent of the dietaries studied.

Table 7. MILK CONSUMPTION OF TEN LOW-INCOME NEGRO FAMILIES

Family			Milk				Amount per day	
Number	Members	A.M.U.	Fresh Whole	Skimmed	Evaporated[2]	Total (equivalent)	Per person	Per A.M.U.[1]
			quarts	quarts	ounces	quarts	quarts	quarts
I	4	3.3	3.5		97.0	9.6	0.086	0.104
II	13	13.0			143.0	8.9	0.025	0.025
III	8	7.7	3.0		15.9	4.0	0.018	0.019
IV	5	4.4	0.2		86.0	5.6	0.040	0.045
V	4	3.4	10.0		94.5	15.9	0.142	0.167
VI	7	6.7	8.0		42.0	10.6	0.054	0.057
VII	5	4.2	14.1		118.5	21.5	0.154	0.183
VIII	2	1.8	7.0		43.5	9.7	0.173	0.193
IX	8	7.7		3.0	165.5	13.3	0.059	0.062
X	5	4.8	16.2		43.5	18.9	0.153	0.143
Total	61	57.0	62.0	3.0	849.4	118.0	0.904	0.998
Average	6.1	5.7	6.2	0.3	84.9	11.8	0.090	0.100

1. A.M.U. - Adult male units for protein and minerals.

2. Calculations - 16 ounces equivalent to 1 quart fresh milk.

This was probably due to the use of an insufficient quantity of milk. The average milk consumption was only 0.1 quart per adult male unit per day. The one family receiving sufficient calcium (V, table 3) consumed only 0.167 quart of milk per adult male unit daily. However, this family used large amounts of cheese, which in spite of the low milk intake, made dairy products their best source of calcium. Dairy products furnished 42.2 per cent of the total calcium in the diets of the ten families which averaged 0.344 gram per adult male unit per day. Vegetables rated second as a source of calcium, supplying 23.1 per cent.

The average intake of phosphorus for the 10 families was 0.961 gram per adult male unit per day (table 3). It ranged from 1.679 grams for Family V to 0.510 gram for Family IX. This nutrient was adequate in only two dietaries. The excess for Family V was 27.2 per cent while Family VIII was only 13.7 per cent above the standard (table 4). The other families ranged from 19.4 to 61.4 per cent below the standard of 1.32 grams per adult male unit per day. The average deficiency for the 10 families was 27.2 per cent.

The chief sources of phosphorus in these diets, arranged in the order of their importance, were grain products, meats vegetables, and dairy products. These

furnished 29.5, 25.8, 23.0, and 12.5 per cent respectively of the total phosphorus (table 5).

For the entire group studied, the average intake of iron was 10 milligrams per adult male unit per day. This was only two-thirds of the desired 15-milligram standard (table 3). Family V had an average excess of 3 milligrams daily, and family VIII, of one milligram. The surplus was due to consumption of large quantities of meat and dried legumes.

If the new iron standard of 12 milligrams suggested by Sherman (12) is accepted the iron intake of Family VII would be regarded as adequate. In that case, Family I and Family II, each receiving 11 milligrams daily, would be regarded as only slightly deficient. The remainder of the groups had an iron intake ranging from 5 to 9 milligrams per adult male unit per day. During the period of investigation, two families were on the 5-milligram level making them 66.7 per cent deficient in this nutrient.

The iron was furnished by three main groups of foods; grain products supplied 29.5 per cent; meat, 28.1 per cent; and vegetables, 28.0 per cent of the iron of the diets (table 5).

None of the diets were adequate in vitamin A. The average for the families was 1645 units per adult male unit

per day (table 3). The degree of deficiency in the diets ranged from 7 per cent for Family V to 86.2 per cent for Family IX.

Even though an insufficient quantity of milk and very little butter was used, dairy products supplied 25.9 per cent of the total vitamin A of the diets. Fruits, eggs, meats, and vegetables, arranged in the order of their importance as sources of this nutrient, furnished 20.8, 18.0, 17.9, and 16.7 per cent respectively of the total vitamin A received from food (table 5).

The vitamin C in these diets averaged 49 units per adult male unit per day. This was 51.0 per cent below the standard of 100 units (table 3). The daily intake for the individual families ranged from 35 to 138 units per day. Vitamin C was adequate in only one of the diets studied (V). In this case it was 38 per cent in excess.

There were only three sources of vitamin C in these diets. Vegetables supplied 50.6 per cent; fruits, 47.5 per cent; and dairy products, 1.9 per cent of the total vitamin C (table 5).

Vitamin G averaged 243 units per adult male unit per day (table 3). This was 67.6 per cent below the 750 units suggested by Stiebeling and Ward (14) as a standard for the adult male unit. The food eaten by these families

supplied from 62 to 820 units of vitamin G per day. Family V was the only one receiving as much as the standard allowance.

Meats were the chief source of this nutrient supplying 41.9 per cent. Vegetables furnished 20.8 per cent; dairy products, 18.6 per cent; and eggs, 12.5 per cent (table 5).

It is probable that the vitamin content of these diets was higher than is indicated in these findings. Inasmuch as the tables used for calculations were not always complete, some foods, which doubtless contained appreciable amounts of vitamins, could not be calculated.

The Money Value of the Diets

The average amount of money expended for food by the 10 families for the 28-day period was $26.24. The largest amount spent by any one family was $35.54 and the smallest sum was $20.20 (table 8). The cost per adult male unit per day ranged from $0.124 to $0.476 with a mean of $0.260 (table 9). This was considerably higher than Spoelstra's mean for 10 low-income White families of $0.169. This can be only partially explained by increase in retail food prices as they rose approximately but 6 per cent in the year which elapsed between these two studies.

Family II, consisting of 13 individuals; Family III

Table 8. SUMMARY OF FOOD COSTS

Family	Adult male units (energy)	Total amount spent for food	Cost per day per adult male unit*
I	2.9	$ 20.69	$0.252
II	10.9	34.76	0.124
III	5.2	35.54	0.244
IV	3.2	21.36	0.261
V	2.6	34.63	0.476
VI	4.9	21.74	0.158
VII	3.0	24.20	0.284
VIII	1.4	20.20	0.454
IX	5.3	25.88	0.164
X	3.6	23.39	0.239
Total	43.0	262.39	2.656
Average	4.3	26.24	0.266

* (Adult male units x 28) corrected for meals eaten out and guest meals. See Table 1.
Spoelstra's average - (1936) - 0.238

Range - this study - $0.124 - $0.454
Range - Spoelstra's study - $0.116 - $0.415

Table 9. RELATIONSHIP BETWEEN MONEY VALUE AND ADEQUACY OF DIETS

Money value per adult male unit per day		Ranking scale of families as to money value of diets per adult male unit	Ranking of families as to adequacy of the diets	
				Lack
5.	$0.476	V	V	Vitamin A
8.	0.454	VIII	VIII	Ca, vitamins A, C, G
7.	0.284	VII	IV	Ca, P, Fe, all vitamins
4.	0.260	IV	I	Everything but protein
1.	0.252	I	VII	Everything but protein
3.	0.240	III	X	
10.	0.239	X	III	
9.	0.164	IX	VI	
6.	0.160	VI	IX	
2.	0.124	II	II	
Total	2.603			
Average	0.260			

	Families		Family
Lacking in all 5 essentials -	2, 3, 6, 9, 10	Lacking in 2 essentials -	0
Lacking in 4 essentials -	1, 7	Lacking in 1 essential -	8
Lacking in 3 essentials -	4	Lacking in no essential -	5

made up of eight members; and Family V with only four in the family, spent similar amounts for food during the period of investigation. The cost of the food for these three groups amounted to $35.54, $34.76, and 34.63, respectively (table 10). The diet of Family V was most nearly adequate in all the nutrients studied. This was to be expected because of the small size of the group and the comparatively large amount spent for food per adult male unit, ($0.476).

The expenditure for grain products ranged from a low of 11.18 to a high of 27.00 per cent (table 11). The average amount spent for grain products was 18.2 per cent of the total expenditure for food (table 12). This amount was 3.2 per cent higher than Stiebeling and Ward (14) recommended for an adequate diet at minimum cost and 1.8 per cent below the amount for a restricted diet for emergency use. It was but slightly lower than the money value of the grain products used by Spoelstra's families (table 12).

More money was spent for meats, fish, and eggs than any other group of foods (table 12), but meat was the item used in largest quantity. The mean expenditure for these commodities was 32.5 per cent of all the money spent for food. This is more than twice the amount recommended by Stiebeling and Ward (14) for an adequate diet at minimum cost and more than three times the amount they suggested for

Table 10. FOOD COST OF THE DIETS OF TEN LOW-INCOME FAMILIES

Food Group	Family I Expenditure	Family II	Family III	Family IV	Family V	Family VI	Family VII	Family VIII	Family IX	Family X
Dairy products	$ 2.13	$ 0.63	$ 4.16	$ 1.57	$ 4.04	$ 1.73	$ 3.43	$ 2.35	$ 3.59	$ 4.37
Eggs	1.10	0.44	1.27	0.76	1.61	0.25	0.85	0.75	0.47	1.01
Fats and oils	1.26	3.46	1.28	1.42	1.34	0.83	0.75	0.17	1.73	2.26
Food adjuncts	1.42	0.62	1.49	0.55	1.21	0.23	0.53	0.81	0.65	0.47
Fruits	1.55	5.44	2.40	0.78	5.24	2.36	1.19	3.25	3.16	1.91
Grain products	3.84	7.42	8.32	4.16	3.87	5.87	4.63	2.57	3.37	3.79
Meats	6.26	11.02	9.68	8.45	10.47	5.64	7.27	7.22	5.65	4.64
Miscellaneous		0.20		0.08	0.30	0.35		0.43	0.80	0.55
Nuts	0.05				0.84					
Sugars and sweets	0.81	2.51	2.42	1.18	1.34	1.12	2.96	1.11	2.22	1.77
Vegetables	2.27	3.02	4.52	2.41	4.37	3.36	2.59	1.54	4.24	2.62
Total	20.69	34.76	35.54	21.36	34.63	21.74	24.20	20.20	25.88	23.39

Average $26.80

Table 11. PERCENTAGE DISTRIBUTION OF MONEY SPENT FOR THE VARIOUS FOOD GROUPS

Food Group	Family I	Family II	Family III	Family IV	Family V	Family VI	Family VII	Family VIII	Family IX	Family X
Dairy Products	10.29	1.81	11.71	7.35	11.67	7.96	14.17	11.63	13.87	18.68
Eggs	5.32	1.27	3.57	3.56	4.65	1.15	3.51	3.71	1.82	4.32
Fats and oils	6.09	9.95	3.57	6.65	3.87	3.82	3.10	0.84	6.68	9.66
Food adjuncts	6.86	1.78	4.19	2.57	3.49	1.06	2.19	4.01	2.51	2.01
Fruits	7.49	15.65	6.75	3.65	15.13	10.86	4.92	16.09	12.21	8.17
Grain products	18.56	21.35	23.41	19.48	11.18	27.00	19.13	12.72	13.02	16.20
Meats	30.26	31.70	27.24	39.56	30.23	25.94	30.04	35.74	21.83	19.84
Miscellaneous		0.58		0.37	0.87	1.61		2.13	3.09	2.35
Nuts	0.24				2.43					
Sugar and sweets	3.91	7.22	6.81	5.52	3.87	5.15	12.23	5.50	8.58	7.57
Vegetables	10.97	8.69	12.71	11.28	12.62	15.46	10.70	7.62	16.38	11.20
Total	99.99	100.00	99.96	99.99	100.01	100.01	99.99	99.99	99.99	100.00

Table 12. COMPARISON WITH STANDARD BUDGETS OF THE PERCENTAGE DISTRIBUTION OF EXPENDITURE AMONG THE VARIOUS FOOD GROUPS.

Food groups	Restricted diet*	Adequate diet at minimum cost*	Food administration budget**	Spoelstra's study	This study
				Money value	
Dairy products	20-30	30-35	20 or more	22.5	10.9
Fruits and vegetables	25-30	25-20	20 or more	25.5	21.9
Meat, eggs, and fish	10	15	20 or less	12.9	32.5
Grain products	20	15	20 or more	19.4	18.2
Fats, sugars, and food adjuncts	20	15	20 or less	19.7	16.5

* Diets at Four Levels of Nutritive Content and Cost, Stiebeling and Ward (14).

** Issued by the United States Food Administration during the World War as part of its educational program. (10).

a restricted diet. In Spoelstra's study these foods, excluding eggs, represented 12.9 per cent of the money value of the diets.

Fruits and vegetables, representing the second largest expenditure of the food money, accounted for 21.9 per cent of the total food cost. This is similar to the amount spent for these foods in the other studies with which they are compared (table 12).

Less money was spent for dairy products than for any other groups of foods amounting to only 10.9 per cent. The sum spent for grain products (18.2 per cent) lay between the amounts recommended for the restricted diet and the adequate diet at minimum cost. The same is true of the money spent for fats, sugars, and food adjuncts. The findings do not agree with the suggestion made in (1) that Negro families use larger amounts of sugar and fats than White families. The money value for these foods for Spoelstra's families was 19.7 per cent compared with an expenditure of 16.5 per cent in this study (table 12).

Comparing the distribution of the food money in this study with that recommended by the U. S. Food Administration as quoted by Sherman (11) it may seem that too little money was spent for dairy and grain products and far too much was spent for meats (table 12).

CONCLUSIONS

1. The diets of 10 low-income Negro families living in Manhattan, Kansas were all to some degree inadequate from the nutritive standpoint.

2. The diets of these families could have been improved by substitution of whole grain products for part of the highly milled ones; by the use of more milk, dried legumes, fresh fruits, and vegetables.

3. A smaller proportion of the food money should have been spent for meat.

4. The families receiving the better diets spent more money for food than would have been necessary to supply an adequate diet.

5. Large families with low-incomes can hardly be expected to furnish adequate food with the limited amount they have to spend.

6. There is great need for an educational program to give instructions to the housewife in a low-income family concerning buying food, planning meals, and preparing the food for her family.

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